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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/737,245	12/15/2003	Palani Balu	44368-0005-US.CON1	5841

25213 7590 11/08/2007

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EXAMINER	
KAM, CHIH MIN	
ART UNIT	**PAPER NUMBER**
1656	
MAIL DATE	**DELIVERY MODE**
11/08/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/737,245	BALU, PALANI	
	Examiner	Art Unit	
	Chih-Min Kam	1656	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *11 April 2007*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *10-14 and 16-23* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *10-14 and 16-23* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *15 December 2003* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *8/6/07*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Status of the Claims

1. Claims 10-14 and 16-23 are pending.

Applicants' amendment filed April 11, 2007 is acknowledged. Applicants' response has been fully considered. Claims 10, 11, 16 and 18 have been amended, claim 15 has been cancelled, and new claims 19-23 have been added. Therefore, claims 10-14 and 16-23 are examined.

Information Disclosure Statement (IDS)

2. Two references on the IDS filed August 6, 2007 are crossed out and not considered because they are not submitted. Please submit these two references.

Withdrawn Claim Rejections - 35 USC § 112

3. The previous rejection of claims 11-17 under 35 U.S.C. 112, second paragraph, is withdrawn in view of applicants' amendment to the claim, applicants' cancellation of the claim, and applicants' response at pages 4-6 in the amendment filed April 11, 2007.

Withdrawn Claim Rejections -Obviousness Type Double Patenting

4. The previous rejection of claim 15, under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-8 of U.S. Patent 6,703,480, is withdrawn in view of applicants' cancellation of the claim in the amendment filed April 11, 2007.

Claim Objections

5. Claim 18 is objected to because of the use of the terms "X'5 is M, F, I or I" and "X'8 is D, E, I, L or V_{11}". Appropriate correction is required.

Maintained Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

6. Previous rejection of claims 10-11 and 18 under 35 U.S.C. 102(b) as being anticipated by Wrighton *et al.* (U. S. Patent 5,773,569) is maintained, and claims 19-20 and 23 are added to the rejection.

Wrighton *et al.* teach a dimeric peptide analog of GGTYSCHFGPLTWVCKPQGG (claim 18) containing two disulfide bonds was prepared by providing a linking moiety (Knorr linker) with a first and second functional group capable of serving as initiation sites for peptide synthesis and a third functional group attachable to a solid support; binding the linking moiety to the solid support; synthesizing the first peptide and then the second peptide wherein each peptide contains two cysteines (claim 10, step (a)); cleaving the synthesized peptide from the solid support and purifying the peptide; and cyclizing the peptide via forming the first disulfide bond, and subsequently forming the second disulfide bond to yield the bicyclic dimer (column 18, lines 25-40; Fig. 12; claim 10, step (b), 11 and 19-20). The reference also teaches the dimeric peptide has an affinity of approximately 2 nM for EPO receptor binding, a 200-fold increase over the value for the parental peptide (200 nM; column 18, lines 41-56; claim 23).

Response to Arguments

Applicants indicate Wrighton teaches a more laborious method of synthesizing a peptide dimer containing two intrapeptidic disulfide bonds. A first peptide is synthesized then a second

peptide is formed, then the dimer is cleaved from the surface and the first disulfide is formed, then protecting groups on the second peptide are removed and the second disulfide is formed. The present invention, on the other hand, teaches a significant improvement in the synthesis of peptide dimers. In Example 13 of the present invention, the intrapeptidic disulfide bond formation is accomplished in a single oxidative step. This results in a significant reduction in the amount of time necessary to synthesize peptide dimers having intrapeptidic disulfide bonds and increases the resulting overall yield of product. In addition, the present invention relates to the discovery that an oxidizing composition could be used to selectively oxidize the thiols in a peptide dimer to form intrapeptide disulfide bonds in preference to the two interpeptidic disulfide isomers (see Example 13). Since Wrighton does not disclose limitation (i) and (ii) of claim 10, thus Wrighton does not anticipate claim 10 (pages 6-7 of the response).

Applicants' response has been considered, however, the arguments are not persuasive because of the following reasons. Claim 10, step (a) merely indicates providing a first and second peptide chain linked to a linking moiety L_K, in which the peptide chain contains amino acid residues capable of forming disulfide bond upon oxidation, and step (b) indicates oxidizing the peptide chains in a manner in favor the formation of intrapeptide disulfide bond rather than the interpeptide disulfide bond, the claim does not indicate how the dimeric peptide is formed via a linking moiety L_K, nor the peptide chain is oxidized via a single oxidized step, all the differences in the synthetic procedure between the instant application and Wrighton's patent as indicated in applicants' arguments (see paragraph above) are not cited in steps (a) and (b) of claim 10. Since the synthetic method of Wrighton's patent is not different from the method of

claim 10 due to lack of description for the method steps, the Wrighton's patent anticipates the method of claim 10.

Claim Rejections-Obviousness Type Double Patenting

The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. See *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970);and, *In re Thorington,* 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent is shown to be commonly owned with this application. See 37 CFR 1.130(b).

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

7. Claims 10-14 and 16-23 are rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-8 of U.S. Patent 6,703,480. Although the conflicting claims are not identical, they are not patentably distinct from each other because claims 10-14 and 16-23 disclose a method for synthesizing a peptide dimer, comprising: (a) providing first and second peptide chains linked to a linking moiety L_K, the chains are capable of disulfide bond formation upon oxidation; and (b) oxidizing the peptide chains in a manner effective to preferentially promote formation of disulfide bonds in the same peptide chain relative to formation of disulfide bonds in different peptide chains, and wherein at least 50% of said peptide dimer comprises a peptide chain having an intrapeptide disulfide bond. This is an obvious variation in view of claims 1-8 in the patent which discloses a method of synthesizing a peptide dimer, comprising: (a) providing a linking moiety L_K having first and second functional groups serving as initiation sites for peptide synthesis, and a third functional group attachable

to a solid support; (b) binding the linking moiety L_k to a solid support through the third functional group; (c) synthesizing a first peptide chain at the first functional group and a second peptide chain at the second functional group, wherein each of said first and second peptide chains contain two cysteine residues positioned to allow intramolecular cyclization through a disulfide bond, and wherein synthesizing the first peptide chain and synthesizing the second peptide chain occur simultaneously; (d) cleaving said peptide chains from said solid support; and (e) oxidizing said peptide chains with an oxidizing composition effective to promote formation of disulfide bonds between cysteine residues in the same peptide chain while minimizing formation of disulfide bonds between cysteine residues in different peptide chains, wherein about 50% or greater of said peptide dimer comprises a peptide chain having an intrapeptide disulfide bond. Both the claims of instant application and the claims of the patent are directed to a method of synthesizing a peptide dimer, comprising providing first and second peptide chains linked to a linking moiety L_K, the chains are capable of disulfide bond formation upon oxidation; and oxidizing the peptide chains in a manner effective to promote formation of disulfide bonds in the same peptide chain. Thus, claims 10-14 and 16-23 in present application and claims 1-8 in the patent are obvious variations of a method of synthesizing a peptide dimer, comprising providing first and second peptide chains linked to a linking moiety L_K; and oxidizing the peptide chains in a manner effective to promote formation of disulfide bonds in the same peptide chain.

Response to Arguments

Applicants indicate they will file a terminal disclaimer upon allowance of the pending claims.

The pending claims are rejected under 35 U.S.C. 102(b) and under the judicially created doctrine of obviousness-type double patenting, thus they are not allowable.

Conclusion

8. No claims are allowed.

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Chih-Min Kam whose telephone number is (571) 272-0948. The examiner can normally be reached on 8.00-4:30, Mon-Fri.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kathleen Bragdon can be reached at 571-272-0931. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Chih-Min Kam, Ph. D.
Primary Patent Examiner

CHIH-MIN KAM
PRIMARY EXAMINER

CMK
November 7, 2007